Defining Biscuits (& Cookies)

BAKING INDUSTRY RESEARCH TRUST

> INFORMATION SHEET

DEFINITION

Biscuit is a term used in New Zealand (and Australia, UK, and South Africa) to describe a baked product that has a cereal base, e.g. wheat, oat or barley, of at least 60% and a low moisture content of 1–5%, excluding any moisture from fillings or icings. It usually has a higher fat content than other baked products, a longer shelf life and a higher energy density. In America the term for this product is cookie, while biscuit refers to a leavened bread-like product that is similar to the UK scone. In this sheet the term biscuit refers to the New Zealand definition.

HISTORY

The word biscuit comes from the Latin *'bis coctus'*, which means twice-baked. It is thought that biscuits have been baked for thousands of years and were originally baked in a hot oven and then cooled in a cool oven, although this process would not be found in modern processing factories. Cookie is derived from a Dutch word, koekje, which means little cake. The low moisture content of biscuits means they have a longer shelf life than other bakery products and so have been used in epic journeys such as sea voyages of the 15th century. British and European tradition involved serving biscuits in a semiformal situation with tea or coffee in between main meals, especially in the afternoons. Small biscuits were preferred so that a range of appearances and flavours could be offered without a large intake of food.

CLASSIFICATION OF BISCUITS (OR COOKIES)

In the UK, biscuits are separated into those made from:

1. Hard dough: This is similar to bread dough, with a stiff consistency. The gluten network is well developed during mixing, so it is an elastic and extensible dough. It is a lean dough as the fat and sugar content are low relative to the flour content. Semisweet, unsweetened and savoury biscuits are made from hard dough.

2. Short dough: This is more closely related to cake dough, although with much less water. The name refers to their high levels of shortening or fat in relation to flour content. This fat reduces the extensibility of the dough meaning these biscuits are more likely to break. The dough also has a high sugar content. It is given very little mixing to keep the gluten network to a minimum, so the consistency can be compared with wet sand – holding together under pressure but crumbling easily. There is also a short dough called soft dough, which contains higher levels again of fat and sugar resulting in an even softer consistency.

In the US, biscuits are classified based on their method of processing, especially they way in which they are shaped, with four main categories:

1. Sheeting or cutting (also called cutting machine dough) – This method is used for hard dough, where it is passed through a series of rollers to obtain the desired thickness. The biscuit shapes are cut out of the sheets using a die which may be plastic or metal. The dough needs to be strong and elastic so that the biscuits hold their shape when the scrap is removed from around the cut biscuits.

2. Rotary moulding – This method is used for short dough and requires a dough with a relatively stiff consistency that is not sticky. The dough is compressed into dies mounted on the surface of a roller, with excess dough scrapped off. The moulded dough piece maintains it shape as it is pushed out of the die onto the baking sheet.

3. Wire cutting – Short dough is extruded through a die and sliced with a tight wire at appropriate intervals. The pressure placed on the dough in the extruder and the thickness of the wire vary dependent on the dough properties.

4. Depositing – Soft dough is shaped by depositing due to its semi fluid consistency and lack of cohesiveness. The dough is extruded through a nozzle and dropped onto a baking sheet. To achieve uniformity in the size and shape of biscuits, the flow of dough is cut off at regular intervals

FURTHER CLASSIFCIATION

1. SWEET AND SEMISWEET BISCUITS MADE FROM HARD DOUGH

Ingredients	The gluten network is well developed but high levels of sugar (20% of flour content) and fat (16–20% of flour) content make the gluten less elastic and extensible. Sodium metabisulfite can be used to condition and relax the dough for processing. Chemically leavened.
Processing	After mixing the dough is sheeted and formed into shapes. Individual biscuits are cut out of a dough sheet, leaving a web of scrap to be removed and added back into the main batch. Biscuits are docked and marked with a pattern before baking. A milk or milk/egg wash can be applied after baking to enhance appearance as well as sprinkled sugar or other similar granular garnish.

Sensory Attributes	For fermentation, compressed yeast is used at 0.5–2%*. High levels of yeast lead to over proofing and collapse of the bagel after boiling.
Finishing	Biscuits can be processed after baking to include a cream sandwich or chocolate coating.

2. MADE FROM SHORT DOUGHS

The majority of biscuits consumed worldwide are made from short dough, so there are a huge range of variations with shapes, flavours and ingredients.

Ingredients	Flour is weak with less than 9.5% Protein. There are no set rules for the amounts of fat and sugar used, which can range up to 100–200% of flour weight. The quality of these ingredients is most important due to the large amounts used in this formulation.
Processing	Short dough can be mixed in a two stage process, with initial creaming of the fat and sugar, although modern processes tend to use the 'all-in' method. The dough is cohesive and plastic but lacks extensibility and elasticity and its consistency will be dependent on the machinery used for forming and shaping. Two main processes for forming are rotary moulding and wire-cutting. Short dough tends to spread during baking due to high fat and sugar content.
Sensory Attributes	Rotary cookies should be thin and smooth with no surface irregularities. Wire cut biscuits tend to be softer and have more chunky ingredients, i.e. Chocolate chips, nuts or raisins.
Finishing	Rotary cookies can be used to make cream sandwiches in the same form as hard sweet biscuits. Wire cut biscuits can be extruded as dual layer biscuits, such as, chocolate with vanilla.

3. BISCUITS OR COOKIES MADE FROM SOFT DOUGHS

Ingredients	Soft dough has a pourable consistency, is rich in fat (65–76% of flour weight) and may be based on whipped egg whites (15–25%). Sugar is 35–40% of the flour weight. Weak flour is used. Often expensive ingredients are used, such as ground almonds, coconut flour or cocoa. Coarse particles are avoided as these would block nozzles during processing.
Processing	Mixing is a two-stage process. The flour and other dry ingredients are added last, and only minimal mixing is needed to avoid toughening of the dough. Temperature of dough = 10–17°C. It is important to control to achieve the correct consistency for depositing the biscuit. Dough flows from the hopper through a nozzle onto the baking sheet. Nozzles may be of different shapes and sizes to alter the appearance of the biscuit. Some depositor's heads rotate to make swirls, while two or more depositors may be synchronised to combine dough of different colours and flavours.
Sensory Attributes	Soft, delicate texture and a 'melt in the mouth' feel. Fragile and subject to breakage. The packaging can be difficult due to irregular shapes.

DECORATION OF BISCUITS

The final product can be altered by secondary processing after baking. A wide range of processes are used to decorate biscuits, but two of the most popular are cream sandwiches and chocolate coating and enrobing. In a cream sandwich the cream is 30% of the final biscuit weight and is made up of sugar, fat, and flavourings such as fruit acids, cocoa and skimmed milk powder. Cream is either poured into a stencil position on the biscuit base or deposited directly onto the base. Various methods of fully enrobing or partially dipping biscuits into a chocolate bath are used. Icings, made from icing sugar, water and sometimes fat or a gelling agent, are another popular finish.

TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	REMEDY
EXCESSIVE SPREAD OR FLOW This is caused by excessive softening of gluten which forms the structure of the biscuit.	Too much sugar Sugar dissolves too quickly Excessively weak gluten Too much Sodium bicarbonate	Decrease amount of sugar Increase particle size of sugar Check ingredient specifications Blend with strong flour Decrease amount of sodium bicarbonate
HOLLOW BOTTOM Either through gas or air between biscuit and steel oven band distorting biscuit; or by biscuit structure being distorted due to toughening of dough.	Uneven balance of baking temperatures or oven conditions. Equipment. Toughness caused by over developed gluten	Monitor and control Check all cutters, moulders and dockers to ensure they are not trapping air under biscuit Blend strong flour with weaker flour Decrease mixing time of dough Increase fat content
CHECKING Biscuits breaking without being subjected to outside forces, or cracks appear which makes handling difficult. (Biscuits lower fat and sugar, and hard dough biscuits or semi sweet biscuits most susceptible.)	Moisture migration from centre to edges after baking to establish equilibrium in biscuit	Decrease oven section temperatures and bake for a longer time Post-baking drying to equilibrate moisture in hot biscuit

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